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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/752,707

01/08/2004

Shuichi Takeuchi

P24443

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7055

7590

02/08/2005

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EXAMINER

HARRINGTON, ALICIA M

ART UNIT

PAPER NUMBER

2873

DATE MAILED: 02/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/752,707

Applicant(s)

TAKEUCHI ET AL.

Examiner

Alicia M Harrington

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1/18/04, 6/17/04.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,6,9,11 and 13 is/are rejected.
- 7) ☒ Claim(s) 2,3,5,7,8,10 and 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 0604.
- 4) ☒ Interview Summary (PTO-413)
Paper No(s)/Mail Date. 0205.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The Examiner has considered the information disclosure statement filed on 6/17/04.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Takeuchi (US 2002/0172132).

Regarding claim 1, Takeuchi discloses an objective lens for an optical pick-up used for converging at least two light beams having different wavelengths on data recording surfaces of at least two optical discs having different recording densities (see sections 8, 37), respectively, a wavelength of a light beam used for a first optical disc (CD) is longer than a wavelength of a light beam used for a second optical disc (DVD) whose recording density is higher than that of the first optical disc (see section 37,40), wherein said objective lens has at least one surface on which a plurality of annular zones are formed (see figure 1a), wherein said at least one surface (see figure 1b, 1c) is divided into an inner area and an outer area outside the inner area (RC), said inner area having a necessary size for providing a first NA (CD)

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required by the first optical disc, and said outer area (RH) having a necessary size for providing a second NA (DVD) required by the second optical disc and higher than said first NA (see sections 37-38,40-42),

wherein with regard to the light beam used for the second optical disc (DVD), an optical path difference generated between at least one of steps formed between adjacent annular zones of said plurality of annular zones within said outer area is lower by a predetermined amount than an integral multiple of the wavelength of the light beam used for the second optical disc (see section 47-50). – Takeuchi discloses the optical path difference of adjacent rings is defined by $D = \text{wavelength times } (n-1)$ or $D = 2 \text{ times the wavelength times } (n-1)$. Therefore, $D = n\lambda - \lambda$ or $D = 2n\lambda - 2\lambda$. The optical path difference function between adjacent rings is lower by a predetermined amount (λ or 2λ) than an integral multiple of the wavelength of light used for the second disk (see figure 3a ,3b and 1a), since the step difference is the same for each zone.

Regarding claim 4, Takeuchi discloses the objective lens according to claim 1, wherein the steps between adjacent annular zones of said plurality of annular zones are formed such that, at each step, an outside annular zone of a step protrudes with respect to an inside annular zone of the step (all the steps protrudes with respect to each other- one doesn't protrude more than the other; see figure 3a and 3b).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 6, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi (US 2002/0172132) in view of Arai (EP 01102251).

Regarding claim 6, Takeuchi discloses an objective lens for an optical pick-up used for converging at least two light beams having different wavelengths on data recording surfaces of at least two optical discs having different recording densities (CCD and DVD; see section 8,37,40) respectively, a wavelength of a light beam used for a first optical disc is longer than a wavelength of a light beam used for a second optical disc (DVD) whose recording density is higher than that of the first optical disc,

wherein said objective lens has at least one surface on which a plurality of phase shift surfaces are formed as a plurality of annular zones (see figure 1a, 1b, 1c),

wherein said at least one surface is divided into an inner area (RC) and an outer area (RH) outside the inner area, said inner area having a necessary size for providing a first NA required by the first optical disc, and said outer area having a necessary size for providing a second NA required by the second optical disc and higher than said first NA (see section 37,38),

However, Takeuchi fails to specifically disclose with regard to the light beam used for the second optical disc, a phase shift amount generated by at least a pair of adjacent annular zones within said outer area is lower by predetermined amount than an integral multiple of 2π .

Arai teaches the optical path difference is related to the optical phase function (see p. 50-51).

That means for a main wavelength (or blazed wavelength), the $B_{2i} = (2\pi/\lambda)b_{2i}$.

$$\begin{aligned} \phi B &\approx 2\pi/\lambda \sum_{i=1}^{\infty} b_{2i} h^{2i} \\ &\approx \frac{2\pi}{\lambda} (n\lambda - \lambda) \quad \text{or} \quad \frac{2\pi}{\lambda} (2n\lambda - \lambda) \\ &\approx 2\pi n - 2\pi \quad \text{or} \quad 4\pi n - 2\pi \end{aligned}$$

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Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made that the phase function for the diffractive ring structure of Takeuchi in the outer area is lower by a predetermined than an integral multiple of 2π , since the phase function is directly correlated to the optical difference as taught by Arai. (The grating structure is across one surface of lens –inner and outer region have the same spacing).

Regarding claim 9, Takeuchi discloses the objective lens according to claim 6, wherein steps are formed between adjacent annular zones of said plurality of annular zones such that, at each step, an outside annular zone of a step protrudes with respect to an inside annular zone of the step (all the steps protrudes with respect to each other- one doesn't protrude more than the other; see figure 3a and 3b).

6. Claims 11,13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi (US 2002/0172132)

Regarding claim 11, Takeuchi discloses an objective lens (10) for a converging at least two light optical pick-ups used for beams having different wavelengths (for CD or DVD) on data recording surfaces of at least two optical discs having different recording densities (CD and DVD; see sections 37,40), respectively, a wavelength of a light beam used for a first optical disc (CD) is longer than a wavelength of a light beam used for a second optical disc (DVD) whose recording density is higher than that of the first optical disc, wherein said objective lens has at least one surface on which a diffracting structure (see section 8) is formed as a plurality of annular zones (see figure 1a, 1b, 1c),

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wherein said at least one surface is divided into an inner area (RC) and an outer area (RH) outside the inner area, said inner area having a necessary size for providing a first NA required by the first optical disc, and said outer area having a necessary size for providing a second NA required by the second optical disc (see figure 2; sections 37-38,40-42) and higher than said first NA. Takeuchi discloses an undefined constant (see section 48). However a mathematical manipulation defines the blazed wavelength in terms of the working wavelength, as illustrated below:

below:

$$\alpha = \frac{\lambda_0 (n-1)}{\lambda (n_0-1)}$$

$$\lambda \alpha = \frac{\lambda_0 (n-1)}{(n_0-1)}$$

$$(n_0-1) \lambda \alpha = \lambda_0 (n-1)$$

$$\frac{(n_0-1)}{(n-1)} \alpha \lambda = \lambda_0 \equiv \text{blazed wavelength}$$

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made that Takeuchi clearly suggests wherein a blazed wavelength in said outer area is lower by a predetermined amount (constant times a fraction $\alpha \left(\frac{n_0-1}{n-1} \right)$) than an integral multiple of the wavelength of the light beam used for the second optical disc, since the step difference between the inner and outer areas is the same.

Regarding claim 13, Takeuchi discloses the objective lens according to claim 11, and discloses the diffractive structure on a convex portion of the lens surface, Takeuchi fails to specifically disclose wherein said diffraction structure has positive refractive power. Although, it would have been obvious to one of ordinary skill in the art at the time the invention was made to design the

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lens with a positive diffractive power so that the rays would be focused in the forward/disc direction and it is known in the art to use a positive lens in objective lens systems.

Allowable Subject Matter

6. Claims 2,3,5,7, 8,10,12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter: Regarding claim 2, prior art taken either singularly or in combination fails to anticipate or fairly suggest the limitations of the dependent claims, in such manner that a rejection under 35 U.S.C 102 or 103 would be proper. The prior art fails to teach a combination of all the claimed features as presented in independent claims, which at least include the optical path difference satisfies the claim condition.

Regarding claim 7, prior art taken either singularly or in combination fails to anticipate or fairly suggest the limitations of the dependent claims, in such manner that a rejection under 35 U.S.C 102 or 103 would be proper. The prior art fails to teach a combination of all the claimed features as presented in independent claims, which at least include the optical phase amount satisfies the claimed condition.

Regarding claim 12, prior art taken either singularly or in combination fails to anticipate or fairly suggest the limitations of the dependent claims, in such manner that a rejection under 35 U.S.C 102 or 103 would be proper. The prior art fails to teach a combination of all the claimed features as presented in independent claims, which at least include the blazed wavelength satisfies the claimed condition.

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Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alicia M Harrington whose telephone number is 571 272 2330.

The examiner can normally be reached on Monday - Thursday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571 272 2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



AMH

Alicia M Harrington
Examiner
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